What is claimed is:

1. A reactor system comprising:

a tank comprising a bottom half and containing a liquid;

one hydrocarbon gas inlet located in the bottom half of the tank, wherein the hydrocarbon gas inlet comprises means of dispersing a hydrocarbon-containing gas into bubbles within said liquid;

one oxidant gas inlet located near or at the bottom of the tank, wherein the oxidant gas inlet comprises means of dispersing an oxygen-containing gas into bubbles within said liquid;

means of forming a gas-induced liquid turbulent region in at least a portion of said liquid sufficient to mix said bubbles of oxygen-containing gas and hydrocarbon-containing gas to provide a reactant gas; and

a reactor body in fluid contact with said tank adapted to receive the reactant gas at conditions favorable for the production of reaction products.

2. The system of claim 1 wherein the tank comprises a column with a height-to-diameter aspect ratio greater than 1 and not more than 15.

3. The system of claim 1 wherein the hydrocarbon-containing gas comprises methane.

4. The system of claim 1 wherein the oxygen-containing gas comprises molecular oxygen.

5. The system of claim 1 wherein the means of forming a gas-induced liquid turbulent region comprises a powered mechanical device, a fluid circulation system, a static internal structure, or combination thereof.

6. The system of claim 5 wherein the powered mechanical device comprises at least one paddle, at least one stirrer, at least one impeller, at least one propeller, or combinations thereof.

7. The system of claim 5 wherein the static internal structure comprises at least one baffle, at least one perforated plate, a packing material, a heat-exchange device, or combinations thereof.

8. The system of claim 1 wherein the means of forming the gas-induced liquid turbulent region employs passing a gas superficial velocity of the combined hydrocarbon-containing gas and oxygen-containing gas between about 5 and about 60 cm/sec through a portion of said liquid.

9. The system of claim 1 further comprising a means for heating or cooling.

10. The system of claim 1 wherein said tank and said reactor body are integrated into a single vessel.

12. The system of claim 1 wherein said reactor body comprises a partial oxidation reaction.

13. A method for forming a reactant gas mixture in a safe and efficient manner before being reacted, comprising the steps of:

providing a tank containing a liquid;

injecting a first feed gas into said liquid in a manner effective to subdivide the first feed gas into bubbles within the liquid;

separately injecting a second feed gas into said liquid in a manner effective to subdivide the second feed gas into bubbles within the liquid;

forming a gas-induced liquid turbulent region in at least a portion of said liquid;

passing bubbles of said first and second feed gases through said gas-induced liquid turbulent region so as to induce gas transfer between the bubbles and to form a reactant gas mixture comprising the first and second feed gases; and

supplying at least a portion of the reactant gas mixture to a reaction zone.

14. The method of claim 13 wherein forming a gas-induced liquid turbulent region employs passing a gas superficial velocity of the combined first and second gases between about 5 cm/sec and about 60 cm/sec.

15. The method of claim 14 wherein forming a gas-induced liquid turbulent region further includes using a powered mechanical device, a fluid circulation system, a static internal structure, or combination thereof.

16. The method of claim 13 wherein the first feed gas comprises a hydrocarbon gas and the second feed gas comprises an oxygen-containing gas.

17. The method of claim 16 wherein the reactant gas mixture has a O_2-to-carbon molar ratio between about 0.1:1 and about 0.8:1.

18. The method of claim 16 wherein the reactant gas mixture has a O_2-to-carbon molar ratio between about 0.45:1 and about 0.65:1.

19. The method of claim 13 further comprising maintaining a pressure between about 300 kPa – 3350 kPa psig within the tank.

20. The method of claim 13 wherein the tank comprises a column with a height-to-diameter aspect ratio between 1 and 15.

21. The method of claim 20 further comprising heating the reactant gas mixture to a predetermined temperature before supplying the reactant gas mixture to the reactor.

22. The method of claim 20 wherein the liquid comprises water, an organic liquid, or combinations thereof.

23. A method for the oxidation of hydrocarbons comprising:

providing a tank containing a liquid;

injecting a hydrocarbon gas into said liquid in a manner effective to subdivide the hydrocarbon gas into bubbles within the liquid;

separately injecting an oxygen-containing gas into said liquid in a manner effective to subdivide the oxygen-containing gas into bubbles within the liquid;

forming a gas-induced liquid turbulent region in at least a portion of said liquid;

passing bubbles of the hydrocarbon gas and of the oxygen-containing gas through said gas-induced liquid turbulent region so as to induce gas transfer between the bubbles

and to form a reactant gas mixture comprising the hydrocarbon gas and the oxygen-containing gas;

supplying at least a portion of the reactant gas mixture to a reactor, and

reacting at least a portion of said hydrocarbon gas with oxygen to form a reaction product.

24. The method of claim 23 wherein forming a gas-induced liquid turbulent region employs passing a gas superficial velocity of the combined hydrocarbon gas and oxygen-containing gas between about 5 cm/sec and about 60 cm/sec.

25. The system of claim 24 wherein the gas superficial velocity is between 10 and 45 cm/sec.

26. The method of claim 23 wherein forming a gas-induced liquid turbulent region include using a powered mechanical device, a fluid circulation system, a static internal structure, a high gas velocity, or combination thereof.

27. The method of claim 23 further comprising maintaining a pressure between about 300 kPa and about 3350 kPa psig within the tank.

28. The method of claim 23 wherein the tank comprises a column with a height-to-diameter aspect ratio between 1 and 15.

29. The method of claim 23 wherein the reactant gas mixture has a O_2-to-carbon molar ratio between about 0.1:1 and about 0.8:1.

30. The method of claim 29 wherein the reactant gas mixture has a O_2-to-carbon molar ratio between about 0.45:1 and about 0.65:1.

31. The method of claim 23 further comprising heating the reactant gas mixture to a predetermined temperature before supplying the reactant gas mixture to the reactor.

32. The method of claim 23 wherein the liquid comprises water, an organic liquid, or combinations thereof.

33. The method of claim 32 wherein the organic liquid comprise a hydrocarbon liquid or a mixture of liquid hydrocarbons.

34. The method of claim 23 wherein the reactor comprises a partial oxidation, and the reaction product comprises hydrogen and carbon monoxide.

35. The method of claim 34 wherein the partial oxidation comprises a catalyst.

36. The method of claim 23 wherein the reactant gas mixture further comprises at least a portion of said liquid.

37. A process for producing C_{5+} hydrocarbons comprising:

providing a tank containing a liquid;

injecting a hydrocarbon gas into said liquid in a manner effective to subdivide the hydrocarbon gas into bubbles within the liquid;

separately injecting an oxygen-containing gas into said liquid in a manner effective to subdivide the oxygen-containing gas into bubbles within the liquid;

forming a gas-induced liquid turbulent region in at least a portion of said liquid;

passing bubbles of the hydrocarbon gas and of the oxygen-containing gas through said gas-induced liquid turbulent region so as to induce gas transfer between the bubbles and to form a reactant gas mixture comprising the hydrocarbon gas and the oxygen-containing gas;

supplying at least a portion of the reactant gas mixture to a partial oxidation reactor;

reacting at least a portion of said hydrocarbon gas with oxygen in the a partial oxidation reactor to form a syngas stream comprising carbon monoxide and hydrogen;

feeding at least a portion of the syngas stream to a hydrocarbon synthesis reactor comprising a hydrocarbon synthesis catalyst; and

converting at least a portion of said syngas stream in the hydrocarbon synthesis reactor to form C_{5+} hydrocarbons.